[illegible]

Fig. 1

Fig. 2

Codon	AA	MSP wt	Edited MSP	MSP wt	Edited MSP	E. coli	Human
TTT	Phe	8	0	0	0.53	0	0.5
TTT	Phe	7	15	0	0.47	1	0.5
TTA	Leu	25	0	0	0.66	0	0.11
TTG	Leu	3	0	0	0.08	0	0.09
TCT	Ser	4	1	1	0.17	0.04	0.27
TCC	Ser	2	3	3	0.09	0.13	0.26
TCA	Ser	10	1	1	0.43	0.04	0.13
TGG	Ser	0	0	0	0	0	0.07
TAT	Tyr	17	2	2	0.85	0.1	0.54
TAC	Tyr	3	18	0	0.15	0.9	0.46
TAA	***	0	0	0	0	0	0.53
TAG	***	0	0	0	0	0	0
TGT	Cys	10	12	0	0.83	1	0.45
TGC	Cys	2	0	0	0.17	0	0.55
TGA	***	0	0	0	0	0	0.7
TGG	Trp	0	0	0	0	0	0
GTT	Leu	9	0	0	0.24	0	0.12
GTC	Leu	0	0	0	0	0	0.11
GTA	Leu	1	0	0	0.02	0	0.03
GTG	Leu	0	34	0	0	1	0.72
GCT	Pro	4	2	2	0.4	0.2	0.14
GCC	Pro	1	8	0	0.11	0.8	0.11
GCA	Pro	5	1	1	0.5	0.1	0.2
CGG	Pro	0	1	0	0	0	0.11
CAT	His	3	0	0	0.75	0	0.54
CAC	His	1	4	0	0.25	1	0.36
CAA	Gln	9	0	0	0.31	0	0.26
CAG	Gln	1	9	0	0.17	0	0.69
CGT	Arg	1	0	0	0	0	0.09
CGC	Arg	1	0	0	0	0	0.32
CGA	Arg	0	0	0	0.17	0	0.05
CGG	Arg	0	3	0	0	0.5	0.15
ATT	Ile	13	0	0	0.85	0	0.39
ATC	Ile	2	20	0	0.1	1	0.52
ATA	Ile	5	0	0	0.25	0	0.08
ATG	Met	3	3	3	1	1	1
ACT	Thr	3	2	2	0.19	0.13	0.36
ACC	Thr	3	13	0	0.19	0.81	0.47
ACA	Thr	9	1	0	0.56	0.08	0.09
ACG	Thr	1	0	0	0.06	0	0.17
AAT	Asn	20	3	3	0.71	0.07	0.29
AAC	Asn	12	38	0	0.29	0.93	0.34
AAA	Lys	38	0	0	0.9	0	0.71
AAG	Lys	4	42	0	0.1	1	0.28
AGT	Ser	5	2	2	0.21	0.09	0.11
AGC	Ser	2	16	0	0.09	0.7	0.14
AGA	Arg	4	3	3	0.67	0.5	0.08
AGG	Arg	0	0	0	0	0	0.23
GTT	Val	15	0	0	0.71	0	0.37
GTC	Val	1	11	0	0.05	0.52	0.12
GTA	Val	5	0	0	0.24	0	0.38
GTG	Val	0	10	0	0	0.48	0.09
GCT	Ala	2	0	0	0.22	0	0.23
GCC	Ala	1	8	0	0.11	0.89	0.33
GCA	Ala	6	1	0	0.67	0.11	0.18
GCG	Ala	0	0	0	0	0	0.28
GAT	Asp	25	27	0	0.93	1	0.21
GAC	Asp	2	2	0	0.07	0	0.48
GAA	Glu	21	3	3	0.84	0.12	0.52
GAG	Glu	4	22	0	0.16	0.88	0.33
GGT	Gly	8	0	0	0.57	0.29	0.6
GGC	Gly	0	0	0	0	0	0.46
GGA	Gly	8	3	0	0.43	0	0.4
GGG	Gly	0	7	0	0	0.21	0.08

Fig. 3b

Codon	AA	gb-casain	gb-casain	MSP wt	Edited MSP	mouse b-casain	mouse b-casain	mouse g-casain	mouse g-casain
TTT	Phe	5	4	9	0	0	4	8	3
TTT	Phe	4	3	7	15	0	4	6	7
TTA	Leu	0	2	25	0	0	0	0	0
TTG	Leu	0	2	3	0	0	0	0	0
TCT	Ser	5	1	4	1	13	5	7	1
TCC	Ser	2	2	2	3	6	14	8	2
TCA	Ser	1	4	10	1	1	3	2	0
TGG	Ser	0	1	0	0	0	0	0	0
TAT	Tyr	2	7	17	2	2	3	2	0
TAC	Tyr	1	2	3	18	2	6	6	7
TAA	***	1	2	0	0	1	0	1	0
TAG	***	0	0	0	0	0	0	0	0
TGT	Cys	1	1	10	12	0	0	1	0
TGC	Cys	0	2	2	0	2	2	2	1
TGA	***	0	0	0	0	0	0	0	0
TGG	Trp	1	1	0	0	0	0	2	2
GTT	Leu	8	1	9	0	0	9	3	3
GTC	Leu	5	2	0	0	16	8	0	1
GTA	Leu	1	2	1	0	1	2	1	0
GTG	Leu	11	5	0	38	10	17	4	1
GCT	Pro	17	6	4	2	8	6	3	0
GCC	Pro	12	0	1	6	8	6	6	4
GCA	Pro	3	13	5	1	5	6	2	2
CGG	Pro	1	0	0	1	0	0	0	1
CAT	His	0	1	3	0	2	6	2	1
CAC	His	5	3	1	4	4	0	3	0
CAA	Gln	5	8	9	0	9	21	8	7
CAG	Gln	16	0	0	8	0	32	12	8
CGT	Arg	0	1	1	0	0	0	0	0
CGC	Arg	0	0	0	0	1	0	0	0
CGA	Arg	0	0	1	0	0	0	0	1
CGG	Arg	1	0	0	3	0	0	0	0
ATT	Ile	4	5	13	0	3	4	3	4
ATC	Ile	6	3	2	20	7	5	8	5
ATA	Ile	1	3	5	0	1	0	2	0
ATG	Met	7	3	3	3	4	12	2	13
ACT	Thr	7	6	3	2	6	4	1	4
ACC	Thr	2	7	3	13	4	4	4	4
ACA	Thr	2	4	9	1	1	1	2	0
ACG	Thr	0	0	1	0	0	0	2	0
AAT	Asn	2	6	29	3	4	6	3	1
AAC	Asn	2	3	12	38	4	9	4	6
AAA	Lys	7	6	38	0	6	7	3	5
AAG	Lys	6	4	4	42	3	6	13	7
AGT	Ser	2	6	5	2	3	6	6	5
AGC	Ser	5	0	2	16	2	6	6	3
AGA	Arg	2	2	4	3	1	8	1	1
AGG	Arg	0	2	0	0	0	0	0	0
GTT	Val	5	6	15	0	7	4	2	3
GTC	Val	8	2	1	11	7	3	3	0
GTA	Val	2	2	5	0	2	4	1	3
GTG	Val	8	4	0	10	0	3	5	3
GCT	Ala	1	3	2	0	6	3	4	2
GCC	Ala	4	7	1	8	6	17	4	3
GCA	Ala	3	7	6	1	4	13	1	1
GCG	Ala	0	1	0	0	0	0	0	0
GAT	Asp	4	5	25	27	3	6	4	2
GAC	Asp	0	2	2	0	1	2	1	0
GAA	Glu	10	6	21	3	8	12	9	6
GAG	Glu	9	5	4	22	5	5	5	5
GGT	Gly	2	1	8	0	0	0	0	0
GGC	Gly	0	0	0	0	0	0	0	0
GGA	Gly	2	1	6	3	1	0	1	0
GGG	Gly	1	0	0	7	1	0	0	0

Fig. 3a

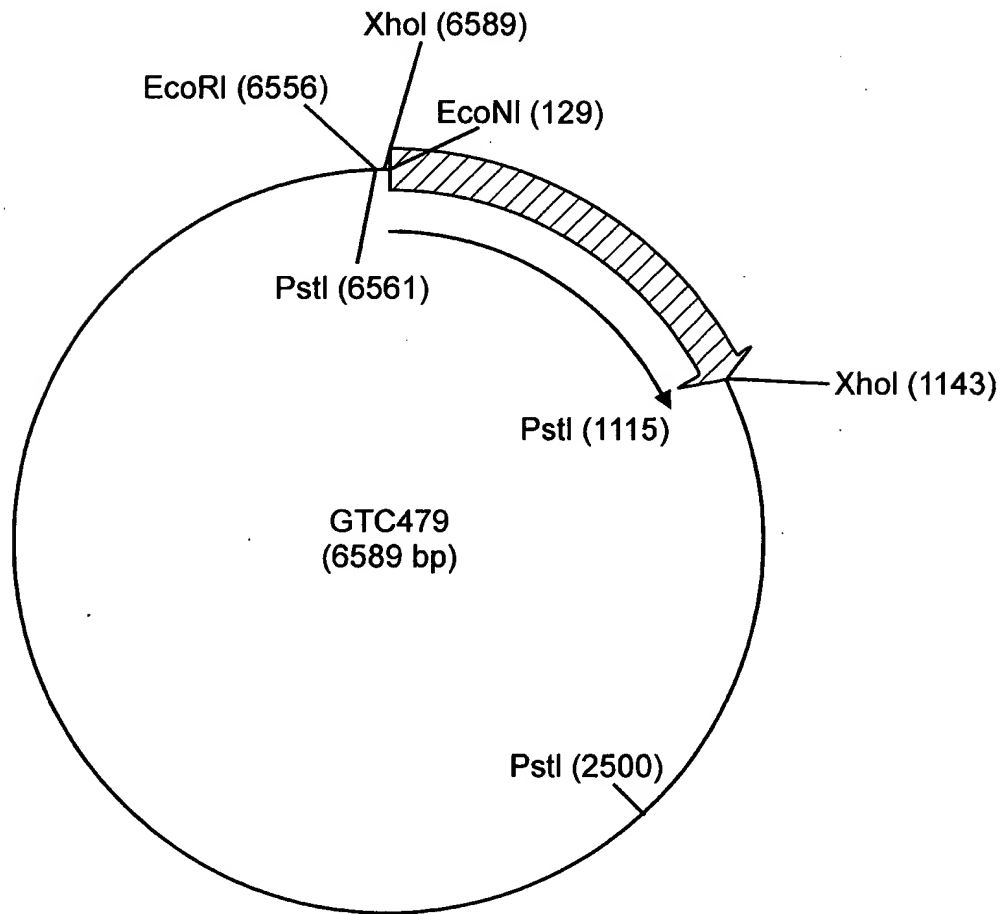


FIG. 4A

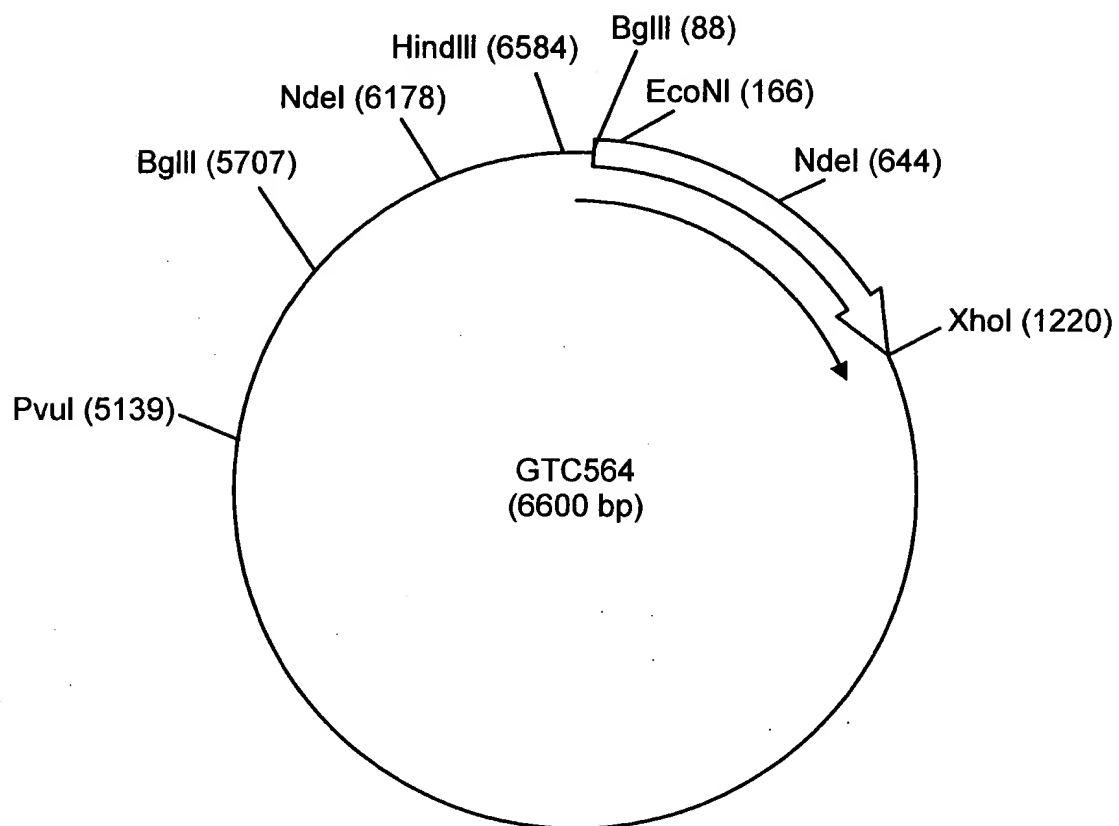


FIG. 4B

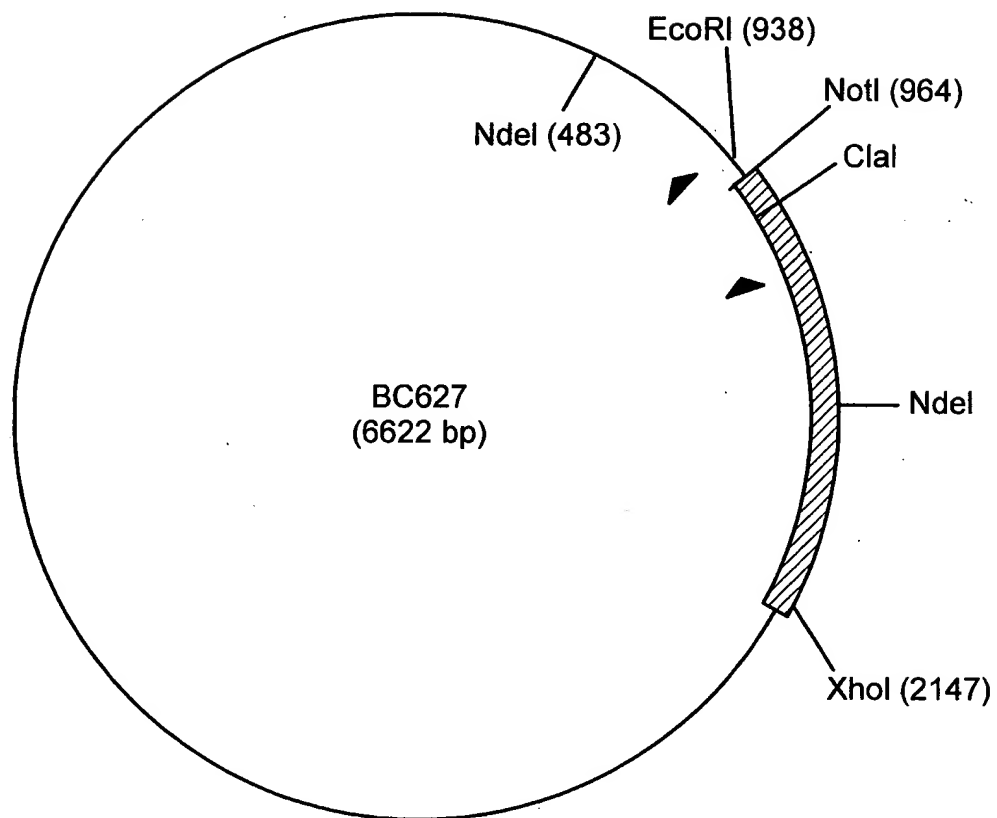


FIG. 4C

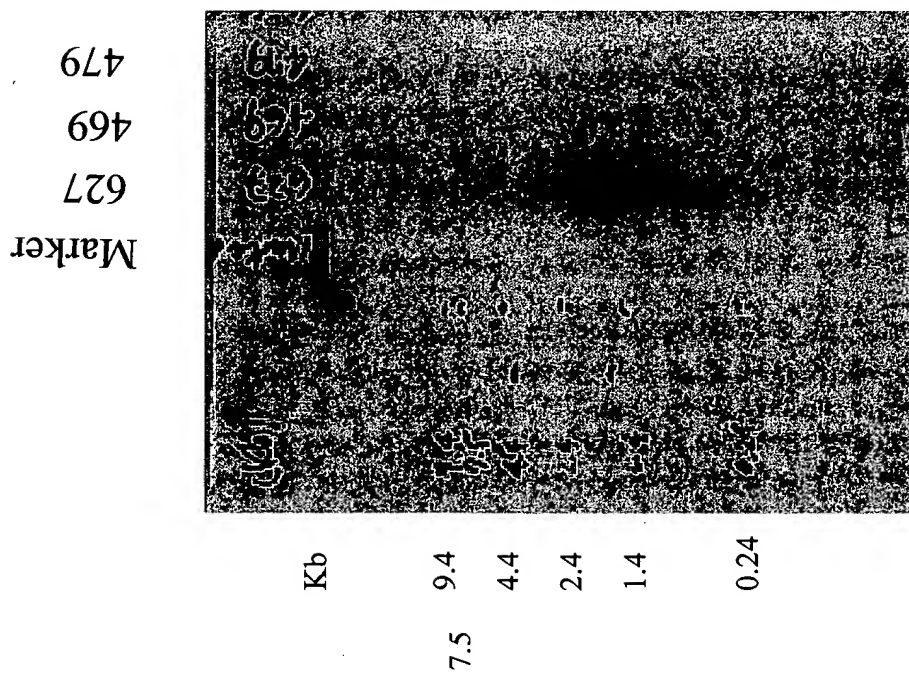


Fig. 5 Panel A

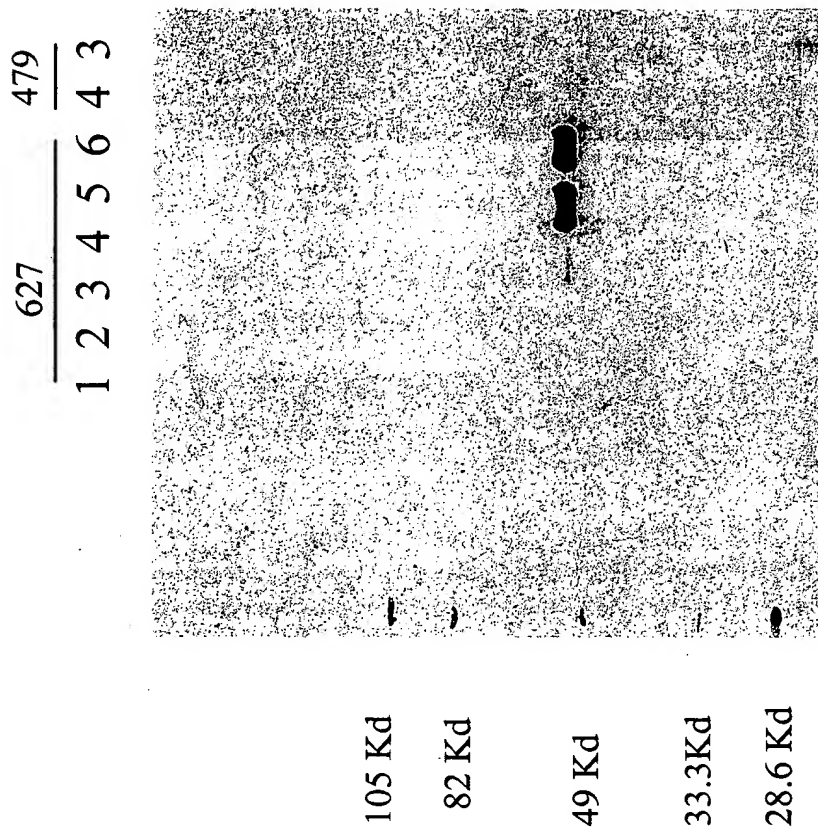


Fig. 5 Panel B

Oligos used:

Sequence ID NO. 3:
TCG ACG AGA GCC ATG AAG GTC CTC ATC CTT GCC TGT CTG GTG GCT
CTG GCC ATT GCA AGA GAG CAG GAA GAA CTC AAT GTA GTC GGT A,

Sequence ID NO. 4:
GAT CTA CCG ACT ACA TTG AGT TCT TCC TGC TCT CTT GCA ATG GCC
AGA GCC ACC AGA CAG GCA AGG ATG AGG ACC TTC ATG GCT CTC G,

Sequence ID NO. 5:
AATAGATCTGCAGTAACCTCCTCCGTAATTG,

Sequence ID NO. 6:
AATTCTCGAGTTAGTGGTGGTGCTGACTGCAGAAATACCATC

Sequence ID NO. J:
TAACTCGAGCGAACCATGAAGGTCCTCATCCTTGCCCTGTGCTGGCTCTGG
CCATTGCA

FIG. 6

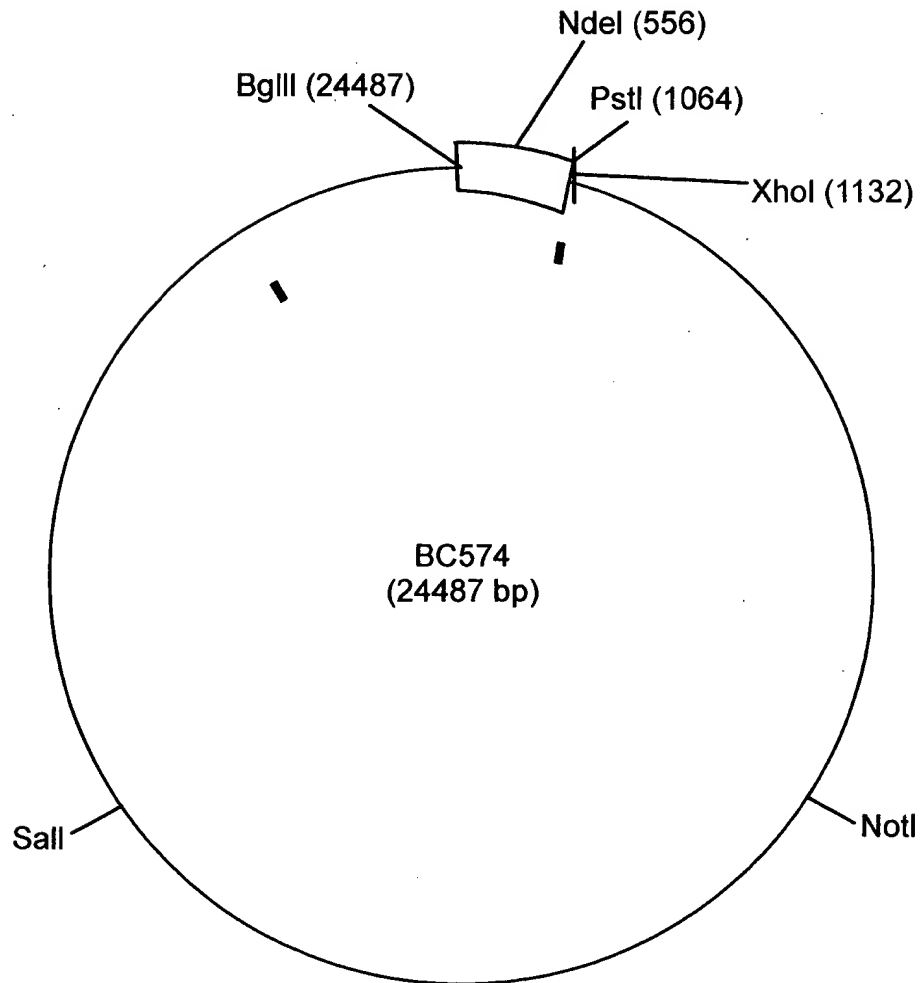


FIG. 7

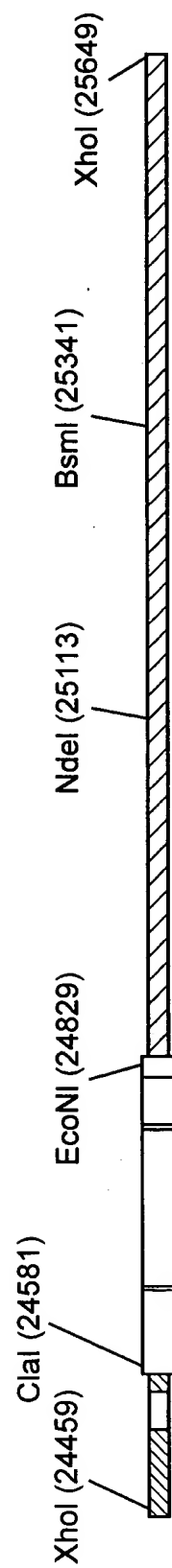


Diagram of BC620

FIG. 8

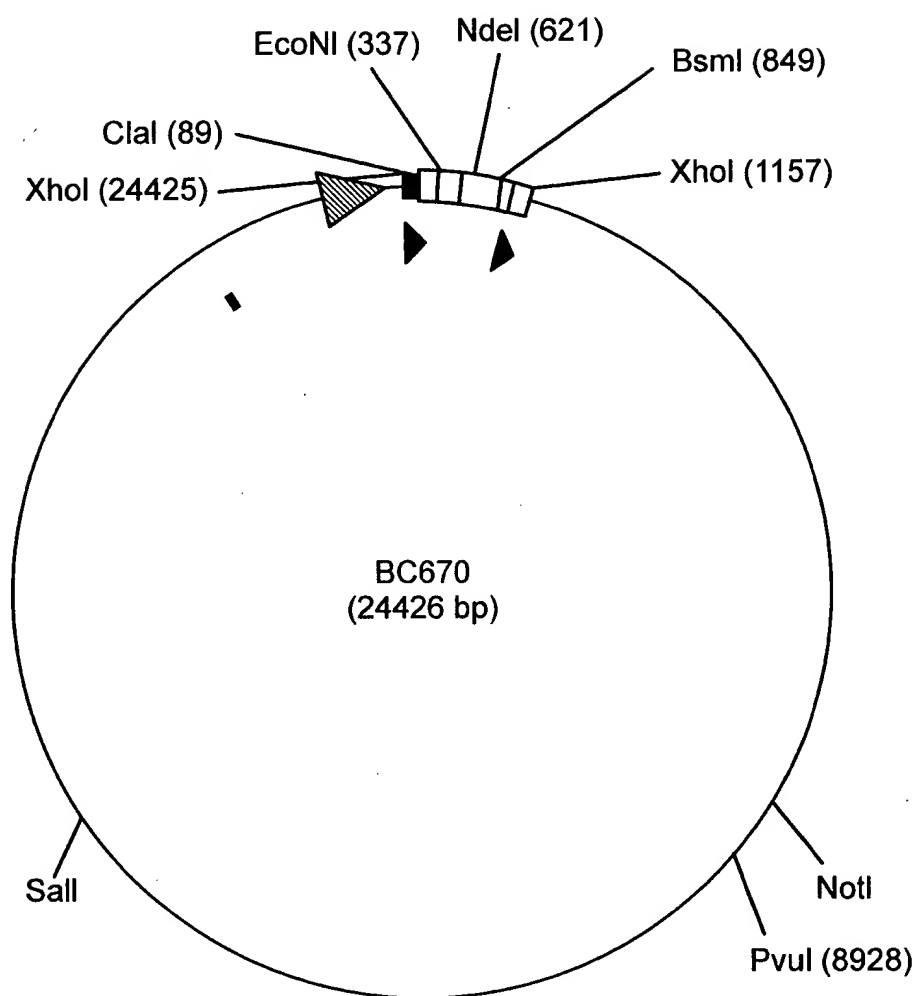


FIG. 9

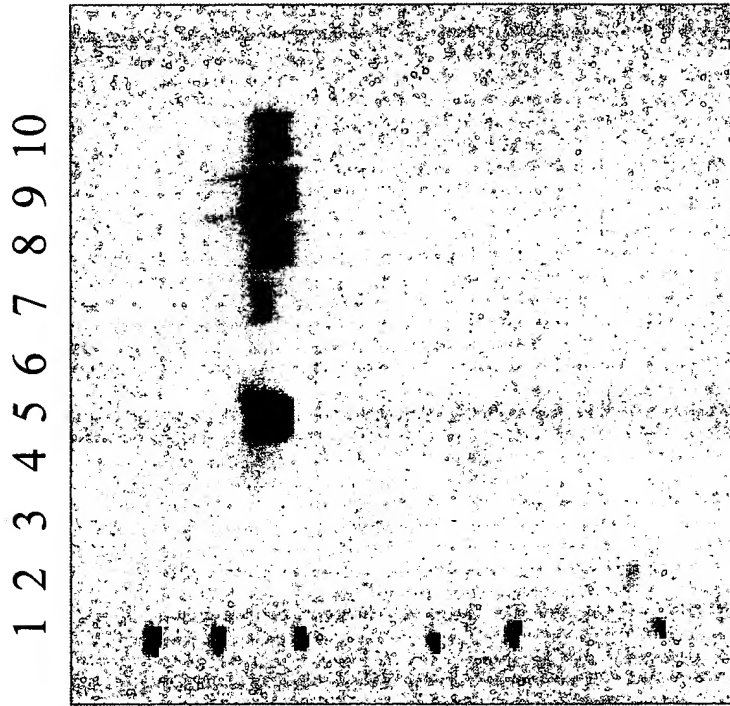


Fig. 10 Western Analysis of MSP Transgenic Milk
Lane 1, Molecular weight marker; lane 2, MSP19; lane 3, non-transgenic mouse milk; lane 4, milk from BC628-146 transgenic mouse; lanes 4-9, milk from BC670 transgenic mice. The blot was reacted with monoclonal antibody 5.2 against MSP.

26 CATGAAGTCTCATAAATTGCTGTCTGGTGGCTTCTGGCCATTGACGCCGTCACTCCCTCCGTCTCATGATAA
1▶ M K V L I A C L V A L A I A A V T P S V I D N
98 CATCTGTCTCAAGATCGAGAACGAGTACGAGGTGCTGTACCTGAAGCCCTGGCAGGAGTCTACAGGAGCC
24▶ I L S K I E N E Y E V L Y L K P L A G V Y R S
159 TGAAGAAGCAGCTGGAGAACACGTGATGACCTCAACGTGAACGTGAAGGATATCTGAACAGCAGGTTCA
48▶ L K K Q L E N N V M T F N V N V K D I L N S R F
241 ACAAGGGAGAACTTCAAGAAGCTGCTGGAGCGGATCTGATCCCTACAGGATCTGACCGAGCAACT
72▶ N K R E N F K N V L E S D L I P Y K D L T S S N
313 ACGTGTCAAAGAT AAGAGAGATAAGTCTCTGAGCAGTTACAATTACA
96▶ Y V V K D P Y K F L N K E K R D K F L S S Y N Y
385 TCAAGGATAGCATTCACACCGATATCAACTTCGCCAAGATGCTCTGGGATACCTACAAGATCTGTCTCGAGA
120▶ I K D S I D T D I N F A N D V L G Y Y K I L S E
457 AGTACAAGAGCGATCTGGATAGCATCAAGAAGTACATCAACGATAAGCAGGAGAGACGAGAACTACCTGC
144▶ K Y K S D L D S I K K Y I N D K Q G E N E K Y L
529 CCTTCTGAAACATCGAGACCCCTGTACAAGACCGTCAACGATAAGATTGATCTCTTCTGATCCACCTGG
168▶ P F L N N I E T L Y K T V N D K I D L F V I H L
601 AGGCCAAG CAG A AGAGCAACGTGGAGGTCAAGATCAAGAGCTGAATTACCTGA
192▶ E A K V L Q Y T Y E K S N V E V K I K E L N Y L
673 AGACCATCCAGGATAAGCTGGCCGATTTCAGAAGAACAACAACCTCTCGGAATCGCCGATCTGAGCACCG
216▶ K T I Q D K L A D F K K N N F V G I A D L S T
745 ATTACAACCAACAACCTGCTGACCAAGTCTCTGAGCACCAGGAAATGCTCTTGGAAAACCTGGCCAAGACCG
240▶ D Y N H N N L L T K F L S T G M V F E N L A K T
817 TCCTGAGCAACCTGCTGGATGGAACCTG BsmI (849) CAG CAGCACCCAGTGTGGAAGAAG
264▶ V L S N L L D G N L Q G M L Q I S Q H Q C V K K
888 CAGTGTCCCCAGAACACGCGATGCTTCAGACACCTGGATGAGAGGGAGAGTGCAAGTGCCTGTGAACT
288▶ Q C P Q N S G C F R H L D E R E E C K C L L N
958 ACAAGCAGGAAGGAGATAAGTGTGGAAAACCCCAATCTTCTTAACGAGAACAAATGGAGGATGCGAT
311▶ Y K Q E G D K C V E N P N P T C N E N N G G C D
1029 GCCGATGCCAAGTGTACCGAGGAGGATTTCAGGAAGCAACGGAAGAAGATCACCTGCGAGTGTACCAAGCC
335▶ A D A K C T E E D S G S N G K K I T C E C T K P
1100 TGATTTATCCACTGTTCGATGGATTTCTGAGTCACCAACCAACCACTAATCTCGAGGATCC XbaI (1157)
358▶ D S Y P L F D G I F C S H H H H H • L E D

Fig. 11

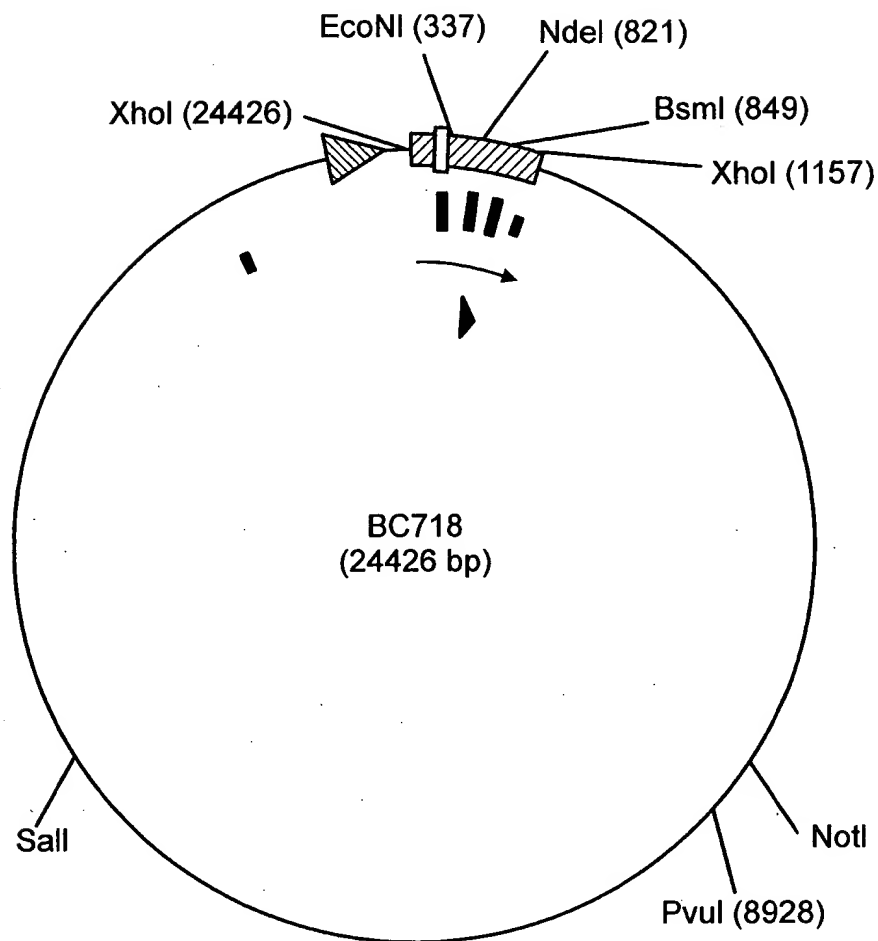
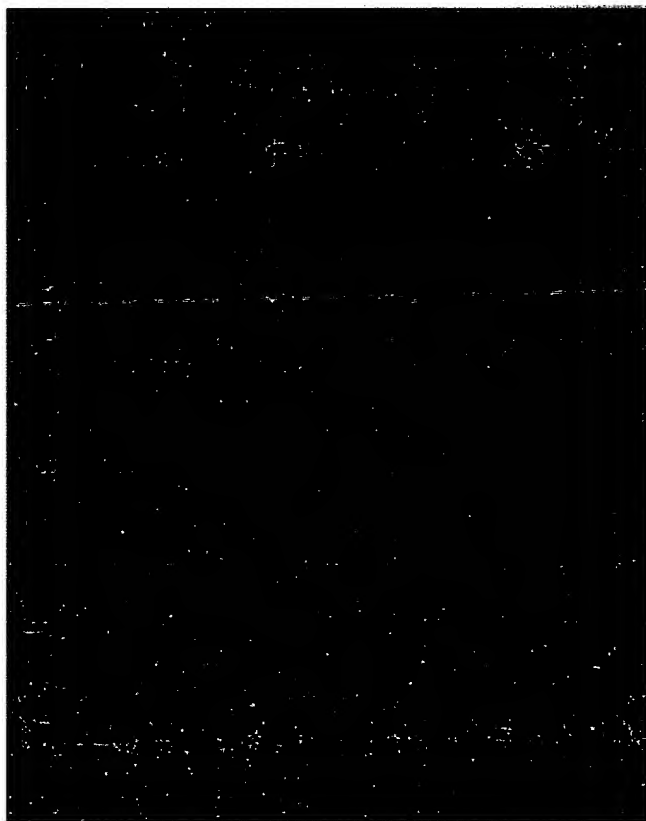


FIG. 12

1 2 3 4 5 6 7 8 9 10 11 12



1. MW marker
2. MSP19
3. Neg Milk
4. 39 BC718
5. 42 BC718
6. 49 BC718
7. 51 BC718
8. 84 BC718
9. 85 BC718
10. 106 BC670
11. 123 BC670
12. 148 BC670

Fig. 13